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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------------|------------------|
| 10/098,714 | 03/15/2002 | Kevin D. MacLean | NMTC-0770 | 3043 |
| 30185 7590 02/26/2007 NUMERICAL TECHNOLOGIES, INC. C/O PARK, VAUGHAN & FLEMING LLP 2820 FIFTH STREET DAVIS, CA 95618-7759 | | | EXAMINER ALHIJA, SAIFA | |
| | | | ART UNIT 2128 | PAPER NUMBER |
| SHORTENED STATUTORY PERIOD OF RESPONSE | | | MAIL DATE | |
| 3 MONTHS | | | 02/26/2007 | |
| | | | DELIVERY MODE PAPER | |

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

| | | | |
|------------------------------|-----------------|----------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/098,714 | MACLEAN ET AL. | |
| | Examiner | Art Unit | |
| | Saif A. Alhija | 2128 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 December 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 March 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-35 have been presented for examination.

Response to Arguments

2. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 26 December 2006 has been entered.

i) Applicant's arguments filed 26 December 2006 have been fully considered but they are not persuasive.

ii) The Examiner notes that Applicants have not specifically responded to the assertion that Claims 1, 11, 21, 31, and 32 contain an intended use as stated in the previous rejection. See section 3 below.

iii) Applicant argues that Cobb does not teach, "using the layout of the target cell as the initial input to the iterative process for the target cell" when the target cell is not equivalent to the preceding cell. It is noted that the claims recite the similarity of cells and not necessarily the equivalence of them. The terms similar and equivalent are defined differently. A 112 2nd rejection has been provided below relating to the issue of the definition of similar. Further, Applicant is arguing:

of Cobb). Applicant respectfully submits that there is no mention of re-using the earlier determined corrections, either as a starting point in the simulation or as used in the model-based analyses, in the case when the areas are not determined to be equivalent. In addition, Applicant submits that the text in page

The Examiner respectfully points out that the claim states if the target cell is not similar to its preceding cell then the target cell is used as the initial input for the corrections and an iterative process is carried out. There is no mention of reuse of earlier corrections when the cells are not similar. In response

Art Unit: 2128

to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., reuse when cells are not similar) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). The reference anticipates the claim as presented since if the cells are not equivalent the analysis is carried out with the initial input being each unique area, or target cell.

Claim Interpretation

3. **Claims 1, 11, 21, 31, and 32** contain the statement "...so that a simulated layout of a solution for the target cell matches a desired layout for the target cell." This statement carries no patentable weight, as it is an intended use of the method.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. **Claims 1-35 are rejected** under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

i) The claims recite the term "similar" which is vague and indefinite. The specification mentions several definitions of the term similar, which reinforces this position. Further, claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Appropriate correction is required.

All claims dependent upon a rejected base claim are rejected by virtue of their dependency.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-35 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Cobb
“Streamlined IC Mask Layout Optical and Process Correction Through Correction Reuse”, WO
00/67074 A1, hereafter referred to as Cobb.

Regarding Claim 1:

Cobb discloses A method for speeding up an iterative process that simulates and corrects a layout of a target cell within an integrated circuit so that a simulated layout of a solution for the target cell matches a desired layout for the target cell, the method comprising:

determining if the target cell is similar to a preceding cell for which there exists a previously calculated solution; (Page 6, Paragraph 2, Analyzer Figure 1, element 109, Equivalency Analyzer. Figure 5, Element 506)

if the target cell is similar to the preceding cell, using the previously calculated solution for the preceding cell as an initial input to the iterative process for the target cell; (Page 8, Paragraph 2, OPC Equivalent. Figure 5, Element 508)

otherwise using the layout of the target cell as the initial input to the iterative process for the target cell; (Figure 5, Element 510, 512, and 514) and

performing the iterative process on the target cell to produce the solution for the target cell, wherein the solution for the target cell is such that the difference between this solution and a desired

Art Unit: 2128

layout for the target cell is less than a pre-specified tolerance. **(Page 8, Paragraph 3, Iteration for correction determination)**

Regarding Claim 2:

Cobb discloses The method of claim 1, wherein the target cell is similar to the preceding cell if the layout of the target cell matches the layout of the preceding cell, but the environment surrounding the target cell differs from the environment surrounding the preceding cell. **(Page 6, Paragraph 2, Equivalency determination)**

Regarding Claim 3:

Cobb discloses The method of claim 2, wherein if the previously calculated solution for the preceding cell is used as the initial input to the iterative process, the iterative process only operates on features within a border region within the target cell that can be affected by the environment surrounding the target cell, and ignores features within the target cell that are not located within the border region. **(Page 6, Paragraph 2, Windowed Area)**

Regarding Claim 4:

Cobb discloses The method of claim 1, wherein the target cell is similar to the preceding cell if the layout of the target cell matches the layout of the preceding cell, and the environment surrounding the target cell matches the environment surrounding the preceding cell. **(Page 6, Paragraph 12, Equivalency Determination)**

Regarding Claim 5:

Cobb discloses The method of claim 1, wherein the simulated layout corresponds to a manufactured result for the layout. **(Page 6, Paragraph 1, IC Mask Layout)**

Regarding Claim 6:

Cobb discloses The method of claim 1, wherein the target cell is similar to the preceding cell if the layout of the target cell differs from the layout of the preceding cell by less than a pre-specified amount. **(Page 5, Top Paragraph, Pre-compensates resultant)**

Regarding Claim 7:

Cobb discloses The method of claim 1, wherein if the previously calculated solution for the preceding cell is used as the initial input for the iterative process, and if the iterative process produces a simulation result that differs significantly from the desired layout, the method further comprises restarting the iterative process using the desired layout instead of the previously calculated solution as the initial input to the iterative process. **(Page 5, Top Paragraph. Figure 5, Elements 506-514)**

Regarding Claim 8:

Cobb discloses The method of claim 1, wherein the iterative process involves repeatedly:
simulating a current solution for the target cell to produce a current simulated layout; **(Page 5, Top Paragraph, Corrections. Figure 1 and 5)**

if the current simulated layout differs from the desired layout by less than a pre-specified amount, accepting the current solution as a final solution for the target cell; **(Page 5, Top Paragraph, Pre-compensates resultant. Figure 1, Elements 108-114 and Figure 5, Elements 506-514)**

and otherwise, correcting the current solution to compensate for differences between the current simulated layout and the desired layout. **(Page 5, Top Paragraph. Figure 1 and 5)**

Regarding Claim 9:

Cobb discloses The method of claim 1, wherein prior to considering the target cell, the method further comprises:

receiving a specification for the layout of the integrated circuit; **(Page 5, Top Paragraph, Areas)**
and dividing the layout into a plurality of cells, whereby each cell can be independently subjected to the iterative process. **(Page 5, Top Paragraph, Unique Areas)**

Regarding Claim 10:

Cobb discloses The method of claim 1, wherein the iterative process performs model-based optical proximity correction (OPC). **(Abstract)**

Regarding Claims 11-20 and 21-30:

See rejection for Claims 1-10.

Regarding Claims 31 - 33:

See rejection for Claim 1.

Regarding Claim 34:

See rejection for Claim 2.

Regarding Claim 35:

See rejection for Claim 6.

Art Unit: 2128

Conclusion

6. All Claims are rejected.

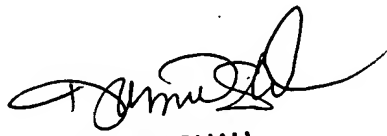
7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Saif A. Alhija whose telephone number is (571) 272-8635. The examiner can normally be reached on M-F, 11:00-7:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini Shah can be reached on (571) 272-22792279. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SAA

February 19, 2007


KAMINI SHAH
SUPERVISORY PATENT EXAMINER

Application/Control Number: 10/098,714

Page 9

Art Unit: 2128